

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (previously presented) A cut off method for a cut off apparatus including:
a preceding knife cylinder on whose peripheral surface a preceding helical knife is provided;
a following knife cylinder on whose peripheral surface a following helical knife, which cuts off a web in cooperation with the preceding knife, is provided;
a preceding knife driving motor which rotationally drives the preceding knife cylinder;
a following knife driving motor which rotationally drives the following knife cylinder; and
a cut off control device which individually controls the preceding knife driving motor and the following knife driving motor,
wherein said method comprises:
giving, when the web is cut, the preceding knife and the following knife a specified amount of torque in the direction in which the preceding knife and the following knife are pressed against each other, by means of the preceding knife driving motor and the following knife driving motor, respectively, wherein the specified amount of torque is generated based on the cutting torque necessary for the knives to cut off the web having a basic weight and being fed at a web feeding speed.
2. (previously presented) A cut off method as set forth in claim 1, wherein the absolute value of the torque given to the preceding knife by the preceding knife driving motor is the same as the absolute value of the torque given to the following knife by the following knife driving motor.

3-18. (canceled)

19. (previously presented) A cut off method as set forth in claim 1, wherein the value of torque given by the preceding knife driving motor is given as a torque pattern generated based on the feeding speed of the web and the length to be cut off.

20. (previously presented) A cut off method as set forth in claim 1, wherein said cutting torque is sufficiently large to resist a cut-off reactive force added from the web to the preceding and following knives, and also to give an appropriate contact force to the preceding and following knives.

21. (currently amended) A cut off method as set forth in claim 19, wherein said torque pattern is a pattern having a rectangular shape, a trapezoidal shape, or a polygonal shape.

22. (currently amended) A cut off method as set forth in claim 19, wherein said torque pattern is changed depending on the web feeding speed.

23. (currently amended) A cut off method as set forth in claim 19, wherein said torque patterns for the preceding knife driving motor and the following knife driving motor are identical.

24. (previously presented) A cut off method as set forth in claim 1, wherein the torque given to the preceding knife by the preceding knife driving motor and the torque given to the following knife by the following knife driving motor have opposite signs when the web is being cut and have the same sign when the web is not being cut.

25. (previously presented) A method of cutting off a web having a basic weight and being fed at a web feeding speed between a preceding knife cylinder that carries on a peripheral surface thereof a preceding knife and a following knife cylinder that carries on a peripheral surface thereof a following knife, said method comprising:

determining an amount of cutting torque ($T_{xa}+T_{xb}$) necessary for the knives to cut off the web, based on the basic weight and the feeding speed of the web; and

while the web is being cut, driving the following knife and the preceding knife respectively with a first torque component T_{xa} and a second torque component T_{xb} of the cutting torque in the direction in which the preceding knife and the following knife are pressed against each other;

wherein the first torque component T_{xa} and the second torque component T_{xb} have opposite signs.

26. (previously presented) A method as set forth in claim 25, wherein the first torque component T_{xa} and the second torque component T_{xb} have different absolute values.

27. (previously presented) A method as set forth in claim 25, wherein the first torque component T_{xa} and the second torque component T_{xb} have the same absolute value.

28. (previously presented) A method as set forth in claim 25, further comprising
while the web is being cut, varying an absolute value of the first torque component T_{xa} or the second torque component T_{xb} .

29. (previously presented) A method as set forth in claim 28, wherein said varying comprises:

raising the absolute value of the first torque component T_{xa} or the second torque component T_{xb} during an initial period of cutting the web;

lowering the absolute value of the first torque component T_{xa} or the second torque component T_{xb} during a subsequent, middle period of cutting the web; and

raising again the absolute value of the first torque component T_{xa} or the second torque component T_{xb} during a subsequent, final period of cutting the web.

30. (previously presented) A method as set forth in claim 29, wherein the absolute value of the first torque component T_{xa} or the second torque component T_{xb} during the initial period of cutting the web is 1.1 to 1.5 times T_{xa} or T_{xb} ;

the absolute value of the first torque component T_{xa} or the second torque component T_{xb} during the middle period of cutting the web is 0.6 to 0.9 times T_{xa} or T_{xb} ; and

the absolute value of the first torque component T_{xa} or the second torque component T_{xb} during the final period of cutting the web is 0.9 to 1.1 times T_{xa} or T_{xb} .

31. (previously presented) A method as set forth in claim 25, wherein the torque given to the preceding knife and the torque given to the following knife have the same sign when the web is not being cut.

32. (previously presented) A method as set forth in claim 25, wherein the first torque component T_{xa} and the second torque component T_{xb} are applied to drive the following knife and the preceding knife, respectively, before the knives contact each other, thereby preventing inverse edges from occurring at the initiation of the cutting of the web.

33. (previously presented) A method as set forth in claim 25, wherein absolute values of the first torque component T_{xa} and the second torque component T_{xb} are smaller than absolute values of torque amounts necessary for acceleration and deceleration of the cylinders.

34. (previously presented) A method as set forth in claim 25, wherein, while the web is being cut, the preceding knife moves backward whereas the following knife moves forward, thereby minimizing influence of the cutting operation on the web feeding speed.